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EVALUATION OF PROPOSED DWARF MISTLETOE PROJECTS, WEST FORK RANGER DISTRICT, BITTERROOT NATIONAL FOREST, MONTANA

by

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ABSTRACT

Residual Douglas-fir and lodgepole pine are dwarf mistletoe-infested and pose a threat to existing regeneration. Felling or girdling these residuals, along with sanitation/thinning of dense patches of regeneration, will reduce dwarf mistletoe intensity and increase future volume yields. Present net worth of the projects ranges from -$1 to $39 per acre. Benefit/cost ratios range from 0.99/1 to 1.42/1. Funding with CFPM money is recommended.

INTRODUCTION

The West Fork RD has proposed dwarf mistletoe control projects in four stands:

Frazier Draw: 24-5-01, 22 acres; and 24-5-02, 25 acres.

Two Creek: 34-3-03, 95 acres; and 34-3-09, 7 acres.

Proposed treatment is presuppression surveys followed by removal of old growth dwarf mistletoe-infested Douglas-fir and lodgepole pine and thinning/sanitation of existing understories. Treatment is needed now because the original prescription did not address dwarf mistletoe.

This evaluation is based on Underwood's field examinations and Dooling's familiarity with the general area from past visits.

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CAUSAL AGENTS, HOSTS, AND DAMAGE

Arceuthobium douglasii infects Douglas-fir, Pseudotsuga menziesii; A. americanum infects lodgepole pine, Pinus contorta. Dwarf mistletoe infection causes a reduction in tree vigor, height, and diameter growth, along with some mortality. Our estimate for average volume loss in infested Douglas-fir type is 20 cubic feet per acre per year. 3/ Volume loss in infested lodgepole pine type is 8 cubic feet per acre per year. 3/ This does not include losses to other pathogens and insects in trees made vulnerable by dwarf mistletoe.

STAND DESCRIPTIONS

Stands 24-5-01 and 24-5-02.--Both stands were logged in 1968 leaving scattered pole- and sawlog-sized, Douglas-fir which is severely infested with dwarf mistletoe. The stands were terraced and planted to ponderosa pine in 1969. The infested residuals are an infection source for naturally established Douglas-fir. Species composition is 80 percent ponderosa pine, 18 percent Douglas-fir, and 2 percent grand fir, with the Douglas-fir component increasing rapidly. Stocking is about 400 to 600 trees per acre. Planted ponderosa pine is about 10 feet tall. New established naturals are generally less than 10 feet tall. Residuals are generally greater than 10 feet tall, up to and including a few merchantable-sized trees, but neither stand supports enough volume to be considered for a timber sale.

Stand 34-3-03.--This stand was clearcut, terraced, and planted to ponderosa pine about 1969. The distance between terraces frequently exceeds 30 feet. Unmerchantable Douglas-fir, lodgepole pine, and subalpine fir were left. Some of these residuals are acceptable crop trees. Stocking is about 600 to 800 trees per acre. Most of the residual Douglas-fir and lodgepole pine are moderately to severely dwarf mistletoe-infested. These residuals are serving as infection sources for naturally established Douglas-fir and lodgepole pine. Species composition is about 30 percent ponderosa pine, 30 percent Douglas-fir, 30 percent lodgepole pine, and 10 percent subalpine fir. Except for the presence of dwarf mistletoe and some light spruce budworm defoliation, the stand is fairly vigorous. The planted ponderosa pine is about 10 feet tall. Naturals that have become established since planting are generally less than 10 feet tall. Residuals are generally greater than 10 feet tall, up to and including a few merchantable-sized trees.

Stand 34-3-09.--This is a 20-year-old, even-aged stand of natural Douglas-fir, lodgepole pine, and ponderosa pine. Species composition is about 40 percent Douglas-fir, 30 percent lodgepole pine, and 30 percent ponderosa pine. Stocking is about 600 to 800 trees per acre. Most of the Douglas-fir, particularly on the more northerly aspects, is moderately to severely dwarf mistletoe-infested. Some light spruce budworm

3/ Dooling, O. J., and R. G. Eder. 1981. An assessment of dwarf mistletoes in Montana. USDA Forest Service, Northern Region, Forest Pest Management Report 81-12.

defoliation is also present, but is not affecting growth. The trees average 10 to 20 feet tall, and are mostly in the large sapling size class. Crown conditions are good; live crown ratios are generally greater than one-third.

All four of these stands are in Management Unit 6 in the West Fork Land Use Plan. Management direction for this unit is to "manage intensively for timber production while giving due consideration to other resource values."

MANAGEMENT ALTERNATIVES

1. Defer treatment.--Potential yields of Douglas-fir and lodgepole pine would be about 50 percent lower than in alternative 2. Dwarf mistletoe infestation would become worse. This alternative requires the least investment.

2. Remove dwarf mistletoe-infested residuals and thin/sanitize existing regeneration.--This would largely eliminate dwarf mistletoe from Douglas-fir and lodgepole pine and maximize volume yields.

3. Convert to nonsusceptible species.--This is biologically sound, but potential yields on these sites would probably be lower than in alternative 2. This would not be as silviculturally desirable as maintaining a diversified stand containing susceptible species.

PREFERRED ALTERNATIVE

Preferred treatment for all four stands is alternative 2.

ECONOMIC ANALYSIS

Economic analyses of the control projects are based on the following data:

Stand	24-5-01	24-5-02	34-3-03	34-3-09
Control costs	$ 98/acre	$102/acre	$ 92/acre	$145/acre
Years to product				
Thin	85	85	85	80
Harvest	115	115	115	110
Yield prediction				
No treatment	8 MBF/acre	8 MBF/acre	8 MBF/acre	8 MBF/acre
Treatment				
Thin	4 MBF/acre	4 MBF/acre	4 MBF/acre	4 MBF/acre
Harvest	13 MBF/acre	13 MBF/acre	13 MBF/acre	13 MBF/acre
Average stumpage, last 5 years	$100/MBF	$100/MBF	$100/MBF	$100/MBF
Discount rate	4 percent	4 percent	4 percent	4 percent

Economic analysis of Stands 24-5-01, 24-5-02, and 34-3-03

Year	Volume without treatment (MBF/acre)	Volume with treatment (MBF/acre)	Benefit of treatment (MBF/acre)	Benefit value at harvest 1/ ($/acre)	Present value of benefit 2/ ($/acre)
0 Age 15	0	0	0	0	0
85 Age 100	0	4	4	2,153	77
115 Age 130	8	13	5	4,875	54
	8	17	9	7,028	131

1/ Current stumpage of $100/MBF increased at 2 percent compound interest.

2/ Harvest value discounted to present at 4 percent.

Economic analysis of Stand 34-3-09

Year	Volume without treatment (MBF/acre)	Volume with treatment (MBF/acre)	Benefit of treatment (MBF/acre)	Benefit value at harvest 1/ ($/acre)	Present value of benefit 2/ ($/acre)
0 Age 20	0	0	0	0	0
80 Age 100	0	4	4	1,950	85
110 Age 130	8	13	5	4,416	59
	8	17	9	6,366	144

1/ Current stumpage of $100/MBF increased at 2 percent compound interest.

2/ Harvest value discounted to present at 4 percent.

Present net worth (PNW) is the difference between present value of benefits and project costs. The benefit/cost ratio (B/C) is present value of benefits divided by project costs. These are:

Stand	PNW	B/C
24-5-01	$33/acre	1.34/1
24-5-02	$29/acre	1.28/1
34-3-03	$39/acre	1.42/1
34-3-09	- $ 1/acre	0.99/1

Increasing stumpage values over time makes the overall project economically feasible.

DISCUSSION

We do not normally consider dwarf mistletoe control projects of less than 20 acres because of rapid reinvasion from surrounding nontreated areas. Stand 34-3-09 is only 7 acres, but it is contiguous with 34-3-03 and its inclusion makes the two stands into a logical control unit.

Recovery of volume losses through dwarf mistletoe control could generate additional employment in the forest products industry and result in "value added." While value added cannot be used in an economic analysis, it is substantial enough to be considered when determining overall benefits. Each million board feet of timber cut creates 7.3 person years of employment, 4/ paying an average of $18,500 per person per year. 5/ For the proposed control projects, this increased employment amounts to 0.029 years per acre in 2067 and 0.036 years per acre in 2097. This would add $536 to the economy in 2067 and $666 in 2096 for each acre in the treatment areas.

Treatment is needed now because the original prescription did not address dwarf mistletoe. Dwarf mistletoe management is part of good silviculture; if we practice good silviculture now, the need for corrective treatment should disappear when we catch up with the backlog.

4/ Personal communication; Charles Keegan, Bureau of Business and Economics Research University of Montana, Missoula, Montana (December 1982).

5/ Personal communication; Paul Polzin, Bureau of Business and Economics Research, University of Montana, Missoula, Montana (December 1982).

RECOMMENDATIONS

Reduction of dwarf mistletoe impact through silvicultural practices is both biologically and economically sound. We recommend the use of insect and disease funds for the projects.

Because control will be by felling or girdling scattered cull trees from areas already essentially clearcut, and thinning of overstocked stands, there will be no additional adverse impact on other resources. The projects are neither major nor controversial, and do not need environmental analyses.